



## **RETRACTABLE, NON-LETHAL HIGH VOLTAGE STUN SWORD**

### **CROSS-REFERENCES TO RELATED PATENTS**

6,404,613      June, 2002      Dowling, et al.

6,091,597      July, 2000      Lin

### **BACKGROUND OF THE INVENTION**

This invention relates to high voltage, low amperage stun devices used primarily for self-protection. The embodiment of the invention is a non-lethal, non-cutting, sword-like device that is retractable into a portable size, but is a viable, self-defense weapon that presents no conflict with most state and local laws.

The prior art is two-fold: the sword, and high voltage self defense mechanisms. The particular type of sword that was the inspiration for the invention is the traditional Japanese sword with a rough blade length of 28-32 inches, (sharp along one side of its entire length as well as at the tip of the blade) and a blade-to-hilt length ratio of approximately three to one. This type of sword is known as a "*katana*."

High voltage self defense devices function by delivering a voltage pulse between two electrodes, typically spaced approximately one inch from each other to allow the current to visibly arc between the electrodes when activated. These devices are currently manufactured in various forms including 1) the traditional hand-held device with electrodes inches from the hand of the operator; 2) a compressed air model that fires a one-time, wire-attached pair of electrodes up to fifteen feet to a target; 3) "stun batons" which are similar to the hand-held model but for an extension of one to two feet from the hand-held trigger to the electrodes. Within the field of stun

batons are both single and multi-stage retractable stun batons that extend an extra foot to eighteen inches from the handle.

Though closest in concept to the invention, multi-stage, retractable stun batons are easily distinguished from the invention on the basis of 1) the design of the retractable portion of a multi-stage stun baton has wider, and fewer telescoping segments (between 1 and 3), creating a shorter overall extended reach than the invention, requiring its user to be closer to the target than if he were using the invention (the preferred embodiment of which has 6 telescoping segments); 2) the resulting dimensions or ratio of shocking surface-to-handle in stun batons are not similar enough to that of a sword for sword techniques to be used; 3) the weight of the retractable portion of the stun baton is such that it is too heavy toward the tip to be used as a sword without either injuring the target with the blow or damaging the baton; 4) the integration of the conductive surface into the inert telescoping member of the stun baton necessitates replacement of the entire unit in case of damage to either of the conductive surfaces or the support member, whereas the independent nature of the mast and probes in the “blade” of the invention allows for rapid replacement of any malfunctioning, worn, or damaged component; 5) the conductive surfaces of stun batons cannot flex or twist, making them both susceptible to breakage as well as not making adequate contact with the target; and 6) the “blade” of the invention fully retracts into its handle, leaving only the very tip of the probes exposed – it extends retracts more fully, and in a more aesthetically pleasing manner, than any retractable stun baton.

## **BRIEF SUMMARY OF THE INVENTION**

The invention is a self-defense device patterned after a Japanese sword, but instead of a long cutting blade finishing with a sharp point, the “blade” of the invention is a combination of twin parallel telescoping, metal probes flanking a light weight inert mast. This “blade” cannot cut or pierce, but instead delivers by contact at any point along its length or tip a disorienting and incapacitating high voltage, low amperage pulse. For portability, the “blade” of the invention fully telescopes from, and retracts into, the hilt. Further, the blade can be deployed instantly by centrifugal force.

The invention solves the problems it was intended to address: swords are illegal to carry for good reason: they are designed to be lethal. However, especially for those skilled in the use of the sword, the ability to use a sword-like device as a modern defense weapon is reborn by using high voltage as a non-lethal, non-cutting, non-puncturing, and practically non-injurious substitute for sharpened steel. Even for those not skilled in the use of a sword, the ability to keep an attacker a considerably further distance away than any stun gun or stun baton can (simply by nature of the length of the invention’s “blade”), to easily wield the device because of its weighting, the ability to maintain and replace components due to the independent operation of the components of the “blade,” the forgiving nature of the “blade,” wherein it flexes and turns to make contact and avoid damage, and the fact that the “blade” fully retracts into a slim, compact form clearly distinguish this invention from any patented device.

## **BRIEF DISCRIPTION OF THE DRAWINGS**

Figure 1: Broad Sketch of Invention With Blade Deployed

Figure 2: Sketches of Tip of Invention And Top of Hilt (Front and Left Views)

Figure 3: Orientation of Components of Blade Assembly (Blade Retracted)

Figure 4: Hilt Assembly (Blade Retracted)

Figure 5: Tip of Invention - Top View (Blade Retracted)

Figure 6: Detail of Top of Blade Toward Tip (Blade Deployed) Showing Independent  
Segmentation of Mast and Probes

## DETAILED DESCRIPTION

The “mast” (labeled “J” in figures 2, 3, and 6) is an inert (*i.e.* non-conductive), multi-segmented telescoping rod. The “probes” (labeled F and G in figures 2, 3, and 6) are two, multi-segmented, telescoping metal rods. In the construction of the preferred embodiment, the mast is made from a telescoping, hollow cylinders of fiberglass or carbon fiber, and the probes are hollow, telescoping, interconnected stainless steel spheres finishing with an approximately 1 cm. solid cylinder. In the preferred embodiment, the mast and probes are either five or six segmented sections each. The conductivity between the segments of the probes is made constant by a fully contained flanged cuff at the base of each segment: the cuff surrounding the base of the probe segment, and the flange in constant contact with the segment that surrounds it. The mast segments are slightly widened at their base, creating a friction lock between all segments when extended, and an overlap of approximately one to one and a half inches between segments for structural integrity.

The probes are heavily insulated on the outside of their first (largest) segment, and are affixed to the mast within the hilt. (See figure 3). At the back end of the probes, insulated wires are connected to the probe through the probe’s insulation. (Figure 3, H and I). At the tip of the blade is the tip spacer/connector: a piece of molded plastic that connects the tip of the mast to the tips of the probes, and maintains the required space and parallel orientation of the probes and mast. (Labeled as “L” on figures 2, 5, and 6). Thus, “deployment” of the blade (figure 1, labeled X) from its fully retracted state to fully extended state is actually the telescoping of three separate rods, bonded together at their first segment and connected at their tips. (See figure 6).

The preferred embodiment is powered by two 9 volt batteries. The preferred embodiment has two switches: a safety switch (figure 4 & 5, labeled D) and a trigger (figure 4&5, labeled E). When the safety is depressed, it completes the circuit from one of the poles of the batteries to the generator circuitry, as well as activates a status light on the side of the unit. The trigger switch is then able to supply the other polarity of the batteries to the generator circuitry when depressed. Once the battery power has been modified by the generator (through coil or through the timed discharge of capacitors, depending on the type of stun generator used) the modified electrical signal is transferred through insulated wires (figure 3, labled H and I) to the back end of the probes.

The electrical signal then travels the entire length of the blade, including the two bulbs of the probes at the tip (figures 2-6, labeled A and B), regardless of its state of deployment. The spark will bridge at the point of greatest conductivity. This point varies along the blade, except when the blade is energized within .5 inches (approximately) of a conductive target. As the probes are set apart at just under one inch, the presence of a conductive material between the poles at a distance from the coils of less than that one inch will draw the pulse, and thus become the pathway of the spark. For demonstration purposes, an optional and adjustable conductive bridge (Exhibit 5 labeled K) is placed between the probes atop the tip spacer/connector insures that the spark will always arc at the tip unless a target is contacted.

In testing the final prototype, the device is very durable, withstanding several hundreds of moderate to heavy strikes on a conductive target, following hundreds of blade deployments. The

design of the blade allows for strikes to the blade itself to handle a lateral strike, with the probes both flexing and rotating to allow the force to be delivered primarily to the mast without misshaping the probes, and distorting the axis of the blade by only about 10 degrees at the tip, which is corrected by re-deployment. Although the invention has been described and illustrated with reference to the preferred embodiment, it should be understood that the claims made in this application are not limited to the preferred embodiment, but would include numerous modifications within the scope of the claims.